

B.Tech. 4th Semester (Civil) F-Scheme Examination,
May-2018

DESIGN OF CONCRETE STRUCTURES-I
Paper-CE-206 F

Time allowed : 3 hours] [Maximum marks : 100

- Note :
- Question No. 1 is compulsory.
 - Students have to attempt 5 questions in total at least one question from each section.
 - Assume any data if missing.

1. (a) What are the factors affecting the strength of concrete ? 4
- (b) Define partial safety factor and factored load. 4
- (c) Explain the phenomena of load distribution in one way slab with diagram. 4
- (d) Discuss in brief basic assumption of straight line theory. 4
- (e) Write down IS 456:2000 recommendations for the longitudinal reinforcement of the column. 4

Section-A

2. Explain the principles of concrete mix design. What are the various factors governing the selection of mix proportion according to Indian standard ? 20

3. What do you understand by the stress strain relationship ? Draw and explain the stress strain relationship of steel in detail. 20

Section-B

4. Find the M.R of doubly reinforced beam of M20 concrete, 200 mm wide and 400 mm effective depth, reinforced with 4 bars (mild steel) of 20 mm dia bars for tension and 2 bars of 20 mm dia. for compression. The cover to compressive reinforcement is 50 mm. 20
5. A simply supported beam 350 mm wide and 650 mm effective depth carries a uniform distributed load of 85 kN/m including its own weight, over an effective span of 6.5 m. The reinforcement consists of 5 bars of 25 mm diameter. Out of these, two bars can be safely bent at 1 m distance from the support. Design suitable shear reinforcement for the beam. Use M25 concrete. $F_y = 250 \text{ N/mm}^2$. 20

Section-C

6. Write down all the parameters of limit state of serviceability and explain any two in detail. 20

7. Design a R.C. slab for room measuring $4.5 \text{ m} \times 5.5 \text{ m}$ from inside. The slab carries a live load of 2500 N/m^2 and finished with 25 mm thick granolithic topping. Use M25 concrete and Fe 415 steel. The slab is simply supported at all the four edges, with corners free to lift. 20

Section-D

8. Design a rectangular isolated footing of uniform thickness for RC column bearing a vertical load of 750 kN, and having a base size of $450 \times 650 \text{ mm}$. The safe bearing capacity of the soil may be taken as 120 kN/m^2 . Use M25 concrete and Fe 415 steel. 20
9. Determine the reinforcement for a short column for the following data : 20

Column size : $450 \times 650 \text{ mm}$ P_u : 2600 kN

M_{ux} : 175 kN M_{uy} : 135 kN

Use M20 concrete mix and Fe 415 steel.